Title: CO_2 AND 0_2 AIR-WATER EXCHANGE IN FLORIDA BAY; HYDRODYNAMIC CONTROLS ON THE GAS TRANSFER VELOCITY (k) AND LINKAGES TO NET ECOSYSTEM METABOLISM

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Project Summary: The exchange of gases across the air-water interface affects the transport of many pollutants and biogeochemical constituents. Accurate estimates of the mass transport of these constituents across the air-water interface are hampered by our ability to predict the gas transfer velocity, or k. We propose to make measurements of k at a wide range of locations in Florida Bay on a temporal scale fine enough to enable future scientists to accurately estimate air-water gas exchange.

The exchange of gases across the air-water interface is a product of the concentration gradient and the gas transfer velocity. The gas transfer velocity is controlled, in part, by the amount of turbulent mixing in the surface aqueous boundary layer. Current estimates of gas exchange in any system are hampered by a lack of accurate estimates of k. This is particularly true in shallow flows where ambiguity associated with k results in a factor ~3 uncertainty in estimates of gas exchange, despite the potential importance of these systems as moderators of terrestrial and anthropogenic constituents before their discharge to the oceans.

Preliminary data using the gradient flux technique show the ability to map k at the small spatial and temporal scales necessary to map the variability of k in small systems. The work proposed here aims to obtain measurements of k in Florida Bay at various locations at fine temporal scales. Measurements of turbulence and processes contributing to turbulence in the aqueous surface boundary layer are also planned with the goal of modeling k based on the morphology and environmental characteristics dominant in a system. This work will particularly enhance past and present work on oxygen and organic

	matter dynamics in Florida Bay.
Relevance to Restoration and/or Resource Management:	Developing a robust estimate of gas transfer at the air/water interface will allow for better mass balance of gaseous/volatile compounds in the bay (e.g., is the bay a source or sink for CO_2, N_2, methane, etc., and does this balance change during increased freshwater inputs).
Geographic Area:	Florida Bay.